

Water-man, or other understanding Person, who dwells by the Water-side.

It would also deserve (thinks he) to be inquired into, whether, when the Tides be highest, the Ebbs be ever lowest; & contra; (which is generally affirmed, and almost put out of question) or rather (which suites best with his *Hypothesis*) whether, when the Tides are highest, both in the *Annual* and *Menstrual Periods*, the Low waters be not also highest; and at Neap-Tides, the Ebbes also very low.

He adds, that he should expect, that the Spring-Tides now coming, and those at the beginning of *September*, should not be so high, as those at the middle of *September*; and then lower again at the beginning of *October*, and after that, higher at the middle of *October*, and higher yet about the beginning of *November* (at the usual times of *Spring-tides* after the *New* and *Full*.)

Considerations and Enquiries concerning Tides, by Sir Robert Moray; likewise for a further search into Dr. Wallis's newly publish'd Hypothesis.

In regard that the High and Low waters are observed to increase, and decrease regularly at several seasons, according to the Moons age, so as, about the *New* and *Full Moon*, or within two or three daies after, in the Western parts of *Europe*, the *Tides* are at the *highest*, and about the *Quarter-Moons*, at the *lowest*, (the former call'd *Spring-tides*, the other *Neap-tides*;) and that according to the height and excesses of the *Tides*, the *Ebbes* in opposition are answerable to them, the highest Tide having the lowest Ebbe, and the lowest Ebbe, the highest Tide; the Tides from the *Quarter* to the *highest Spring-tide* increasing in a certain proportion; and from the *Spring-tide* to the *Quarter-tide* decreasing in like proportion, as is supposed: And also the *Ebbes* rising and falling constantly after the same manner: It is wished, that it may be inquired, in what proportion these Increases and Decreases, Risiings and Fallings happen to be in regard of one another?

And 'tis supposed, upon some Observations, made in fit places, by the above-mentioned Gentleman, though, (as himself acknowledges) not thoroughly and exactly performed, that the Increase of the *Tides* is made in the *Proportion of Sines*; the first Increase exceeding the lowest in a small proportion; the next in a greater; the third greater than that; and so on to the mid-most, whereof the excess is greatest, diminishing again from that, to the highest *Spring-tide*; so as the proportions, before and after the *Middle*, do greatly answer one another, or seem to do so. And likewise, from the *highest Spring-tide*, to the *lowest Neap-tide*, the *Decreases* seem to keep the like proportions; the *Ebbes* rising and falling in like manner and in like proportions. All which is supposed to fall out, when no Wind or other Accident causes an alteration,

And



And whereas 'tis observed, that upon the main Sea-shore the Current of the Ebbings and Flowings is sometimes swifter, and sometimes slacker, than at others, so as in the beginning of the Floud the Tide moves faster but in a small degree, increasing its swiftness constantly till towards the Middle of the Floud; and then decreasing in velocity again from the Middle till to the top of the High-water; it is supposed, that in Equal spaces of Time, the Increase and Decrease of velocity, and consequently the degrees of the Risings and Fallings of the same, in Equal spaces of time, are performed according to the Proportion of Sines.

But 'tis withall conceived, that the said Proportion cannot hold exactly and precisely, in regard of the Inequalities, that fall out in the Periods of the Tides, which are commonly observed and believed to follow certain Positions of the Moon in regard of the Equinox, which are known not to keep a precise and constant Course: so that, there not intervening equal portions of Time between one New Moon and another, the Moons return to the same Meridian, cannot be alwaies perform'd in the same Time; and consequently there must be a like Variation of the Tides in the Velocity, and in the Risings and Fallings of the Tides, as to equal spaces of time. And the Tides from New-moon to New-moon being not alwaies the same in number, as sometimes but 57, sometimes 58, and sometimes 59, (without any certain order of succession) is another evidence of the difficulty of reducing this to any great exactness. Yet, because 'tis worth while, to learn as much of it, as may be, the Proposer and many others do desire, That Observations be constantly made of all these Particulars for some Months, and, if it may be, years together. And because such Observations will be the more easily and exactly made, where the Tides rise highest, it is presumed, that a fit Apparatus being made for the purpose, they may be made about Bristol or Cheap-stow, best of any places in England, because the Tides are said thereabout to rise to ten or twelve fathoms; as upon the coast of Britanny in France, they do to thirteen and fourteen.

In order to which, this following Apparatus is proposed to be made use of. In some convenient place upon a Wall, Rock, or Bridge, &c. let there be an Observatory standing, as neer as may be to the brink of the Sea, or upon some wall; and if it cannot be well placed just where the Low water is, there may be a Channel cut from the Low water to the bottom of the Wall, Rock, &c. The Observatory is to be raised above the High-water 18. or 20. foot; and a Pump, of any reasonable dimension, placed perpendicularly by the Wall, reaching above the High-water as high as conveniently may be. Upon the top of the Pump a Pulley is to be fastned, for letting down into the Pump a piece of floating wood, which, as the water comes in, may rise and fall with it. And because the rising and falling of the water amounts to 60. or 70. foot, the Counterpoise of the weight, that goes into the Pump, is to hang upon as many Pulleys, as may serve to make it rise & fall within the space, by which the height of the Pump exceeds the height of the Water. And because by this

this means the Counterpoise will rise and fall slower, and consequently by less proportions, than the weight it self, the first Pulley may have upon it a Wheele or two, to turn *Indexes* at any proportion required, so as to give the minute parts of the motion, and degrees of risings and fallings. All which is to be observed by *Pendulum-watches*, that have *Minutes* and *Seconds*, with *Checkes*, according to Mr. *Hugens*'s way.

And because if the Hole, by which the water is let into the Pump, be as large as the Bore of the Pump it self, the weight that is raised by the water, will rise and fall with an Undulalation, according to the inequality of the Sea's Surface, 'twill therefore be fit, that the Hole, by which the water enters, be less than half as bigg as the Bore of the Pump; any inconvenience that may follow thereupon, as to the Periods and Stations of the Floud and Ebb, not being considerable.

And to the end, that it may appear the better, what are the *particular Observations*, desired to be made, near *Bristol* or *Cheap-stow* bridg, it was thought not amiss, to set them down distinctly by themselves.

1. The degrees of the Rising and Falling of the water every quarter of an hour (or as often as conveniently may be) from the Periods of the Tides and Ebbs; to be observed night and day, for 2 or 3 months.

2. The degrees of the velocity of the Motion of the Water every quarter of an hour for some whole Tides together; to be observed by a second *Pendul-watch*; and a logg fastened to a line of some 50 fathoms, wound about a wheel.

3. The exact measures of the Heights of every utmost High-water and Low-water, from one Spring-tide to another, for some Months or rather Years.

4. The exact Heights of Spring-tides and Spring-Ebbs for some Years together.

5. The Position of the Wind at every observation of the Tides; and the times of its Changes; and the degrees of its Strength.

6. The State of the Weather, as to Rain, Hail, Mist, Hazineis, &c. and the times of its Changes.

7. At the times of observation of the Tides, the height of the *Thermometer*; the height of the *Baroscope*; the height of the *Hygroscope*; the Age of the Moon, and her *Azimuths*; and her place in all respects; And lastly the *Sun's* place; all these to minutes.

And it would be convenient, to keep *Journal Tables*, for all these Observations, each answering to its day of the Month.

For the *Apparatus* of all these observations, there will be particularly necessary.

A good *Pendulum-watch*.

A *Vane* shewing *Azimuths* to minute parts.

An *Instrument* to measure the strength of the Winde.

A large and good needle shewing *Azimuths* to degrees.

Thermometers, Barometers, Hygrometers.

These Observations being thought very considerable as well as curious, 'tis hoped, that those who have conveniency, will give encouragement and assistance for the making of them; and withall oblige the publick by imparting, what they shall have observed of this kind: The Publisher intending, that when ever such observations shall be communicated to him, he will give notice of it to the publick, and take care of the improvement thereof to the best use and advantage. A Pattern of the Table, proposed to be made for observing the Tides, is intended to be published the next opportunity, God permitting.

*An Account
Of several Books lately published.*

I. Johannis Hevelii D E S C R I P T I O C O M E TÆ, Annæ Æra Christianæ MDCI XV. exorti; unde cum M A N T I S S A Prodromi Cometici, Observaciones omnes prioris C O M E TÆ M D C L I V, ex iisque genuinum mitum accuratè deductum, cum Notis & Animadversionibus, exhibens.

This Book (as the Title it self intimates) undertakes two things. First, To give an Account of the Second of the two late Comets, which appeared, when the other was scarce extinst; Concerning which, the Author doth, from the Observations made by himself with a Sextant of 6 foot, and divided into minutes and seconds, assign both its true place (as well in respect of the Ecliptick as the Equator) and its proper motion: Adding a fair Delineation of its Course, together with the genuine Representations of its Head and Train, in each day of its apparition; and subjoyning a General Description and Discourse of some of the more notable Phenomena thereof. It was first seen at Dantzick by the Watchmen, the 5th of April st. n. 1665, and then observed by the Author, from April 6. about $1\frac{1}{2}$ of the Clock in the morning, till April 20. at 3. in the morning. During which time, it went with a reasonable velocity; making 46 deg. in its Orb, according to the Order of the Signs, moving from the Breast of Pegasus, towards the Head of Andromeda, and the Left Horn of Aries; having, as 'tis presumed, taken its rise from above Sagittary, and run through the Breast of Antinous, under Aquila, and the Dolphin, to the said Pegasus; and so on, as is already expressed.

The Head of it is in the Book described of a Colour like that of Jupiter, all along much brighter than that of the former Comet, though of a somewhat less magnitude; having in its middle onely one round, but very bright and big Kernel or Speck, resplendent like Gold, and encompassed with another more dilute and seemingly uniform matter: its Tail being at first, about 17 deg. and afterwards 20. and sometimes 25 deg. long, and divercated towards the End.

Next, it is observed, that though this Star did afterwards slacken its pace, yet it retained the vividnes of its Colour, both of the Head and Train; the Head especially, keeping at the time as well of the last observations, as of the